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Anthracite Survey Paper No. 8 December 17, 1945

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THE FOREST SITUATION IN DAUPHIN AND LEBANON COUNTIES

PENNSYLVANIA

NORTHEASTERN FOREST EXPERIMENT STATION

NORTHEASTERN FOREST EXPERIMENT STATION

Philadelphia, Pa.

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* * * *

DIVISION OF FOREST ECONOMICS

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This is the second of a series of seven brief reports on the forest condition in the counties of the Anthracite Forest Region. This Region includes 15 counties shown on the map on the back of this publication, which contain or surround the hard-coal deposits of Pennsylvania. Because of basic similarities, Dauphin and Lebanon Counties are treated together. The purpose is to present tabular data from the Anthracite Forest Survey for local use, together with enough general information about the two counties to make the forest situation understandable. Forest areas and present condition of the forest were determined through interpretation of aerial photographs, and the distribution of the major forest types was ascertained largely by reconnaissance. Data on species, size-classes, volume, and growth applicable to the several forest types and condition classes were collected by detailed field surveys.

Acknowledgement is made to John A. Buttrick and Donald F. Robinson for aid in compiling and writing the report, and to Robert Bartlett for preparation of charts and maps.

FOREST SITUATION IN DAUPHIN AND LEBANON COUNTIES

PENNSYLVANIA

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FIGURE 1.- FOREST AREA IN DAUPHIN AND LEBANON COUNTIES OF PENNSYLVANIA

THE FOREST SITUATION IN DAUPHIN AND LEBANON COUNTIES

The forests are of less fundamental importance to the local economy in Dauphin and Lebanon Counties than elsewhere in the Anthracite Region. Except in the northern section, forested areas comprise a relatively small proportion of the whole. And the economy of the counties rests almost entirely on manufacture and agriculture.

General Description

Dauphin and Lebanon Counties, lying on the dividing line between the coal fields and the richest agricultural land in Pennsylvania, show in some degree the characteristics of both. In the north is a series of sharp ridges, covered with a virtually unbroken tract of forest land, the northern part of which contains the west end of the coal fields. The southern two-thirds of these counties is a rich and well-developed agricultural region, the Kittatinny Valley, dotted here and there with manufacturing communities, the largest of which centers about the State Capital, Harrisburg.

The ridges in the north, which rise in places to more than 1700 feet, are a continuation of the ridge formation of Schuylkill County, and run in a generally westerly direction to the Susquehanna River. Indeed the ridges continue beyond the river, the river having carved its way through them. The valleys between these ridges are drained into the Susquehanna by a series of parallel creeks, the most important of which are the Mahantango, which forms the northern boundary of Dauphin County, and the Wiconisco. The southeastern part of the ridge country and much of the farming region of Lebanon and southern Dauphin are drained by the Swatara Creek, which rises in Schuylkill County, cuts down through the ridges, meanders through the farming region, and empties into the Susquehanna at Middletown. The southeastern portion of Lebanon County is drained into the Schuylkill by the Tulpehocken Creek. The total area of the two counties is 911 square miles or 583,040 acres.

The climate is favorable to farming. The average annual rainfall is about 40 inches, well distributed through the year. Temperatures range from -10° to 100°F. Snow covers the ground about three months in the year. Ice storms are rare.

Transportation

Transportation was provided during the middle of the last century by the old Union Canal, built between 1821 and 1828, which followed up the Tulpehocken Creek from the Schuylkill River, crossed the low divide to the east of Lebanon city, and followed down the Quittaphilla and Swatara Creeks to the Susquehanna. This canal was abandoned in 1889 and was superseded by the railroads. The most important of these are the Reading, which serves the whole region, and the Pennsylvania, which

serves Dauphin County, Harrisburg being a principal railroad center with connections in all directions. In more recent years a system of highways has been built, and the two counties now have over 800 miles of improved state highway. Bus and truck transportation on these highways supplement the service provided by the railroads. Several airports are located in the area, the principal commercial airport being at Harrisburg. Two others are at present restricted to military use. Transportation facilities through most of the two counties are thus exceptionally good. Parts of the ridge country on the other hand are almost inaccessible.

Population

The population of these two counties in 1940 was 250,051, an increase of nearly 82,000 since the beginning of the century. In the last five years war industries have brought an estimated immigration of 15,000[1]. The principal cities of the region are Harrisburg (population 1940: 83,893) and Lebanon, the county seat of Lebanon County (population 1940: 27,206). The largest borough, Steelton, had a population in 1940 of 13,115. Other communities of importance are Middletown, Hummelstown, Hershey, and Lykens in Dauphin County, and Palmyra and Annville in Lebanon. Over half the population (141,643) is located in the metropolitan district of Harrisburg. Less than a tenth (23,674) lives on farms.

Occupations

The principal industry of the area is metal and metal products manufacture, the output of which in 1940 was valued at $67,647,500[2]. At that time there were 63 plants in operation with a total employment of 12,978. One of the steel companies also operates an iron mine at Cornwall. The metal industry has been expanding as a result of war demands. Between 1940 and 1942 the output was more than doubled, and the employment increased by nearly 50 percent.

Second in importance is the food products industry with a total output for 1940 valued at $65,744,800. There were then 168 plants in operation with a total employment of 5973, of whom 3118 were employed by a single corporation. This industry also has expanded somewhat since 1940.

Third in importance is the textile industry. In 1940, 65 plants were scattered over the two counties from Millersburg to Rexmont, with a total employment of 8040 and a total output valued at $15,452,900. Thirty of them were employing 100 or more persons. The output of this

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1/ See "The Population and employment Outlook for the Anthracite Region of Pennsylvania, "Anthracite Survey Paper No. 6, May 1, 1945, for a detailed analysis of the situation in Dauphin and Lebanon Counties.

2/ Tenth Industrial Directory of the Commonwealth of Pennsylvania; Dept. of Internal Affairs; compiled by the Bureau of Statistics, Harrisburg 1941

industry increased over 70 percent between 1940 and 1942, but employment remained the same.

Altogether there were in 1940, 543 manufacturing plants employing 38,013, with a total output valued at $183,393,800. By 1942 the output had inincreased by well over $100,000,000 and the employment by nearly 5000. To how great an extent this increase can be maintained after the war is difficult to foretell.

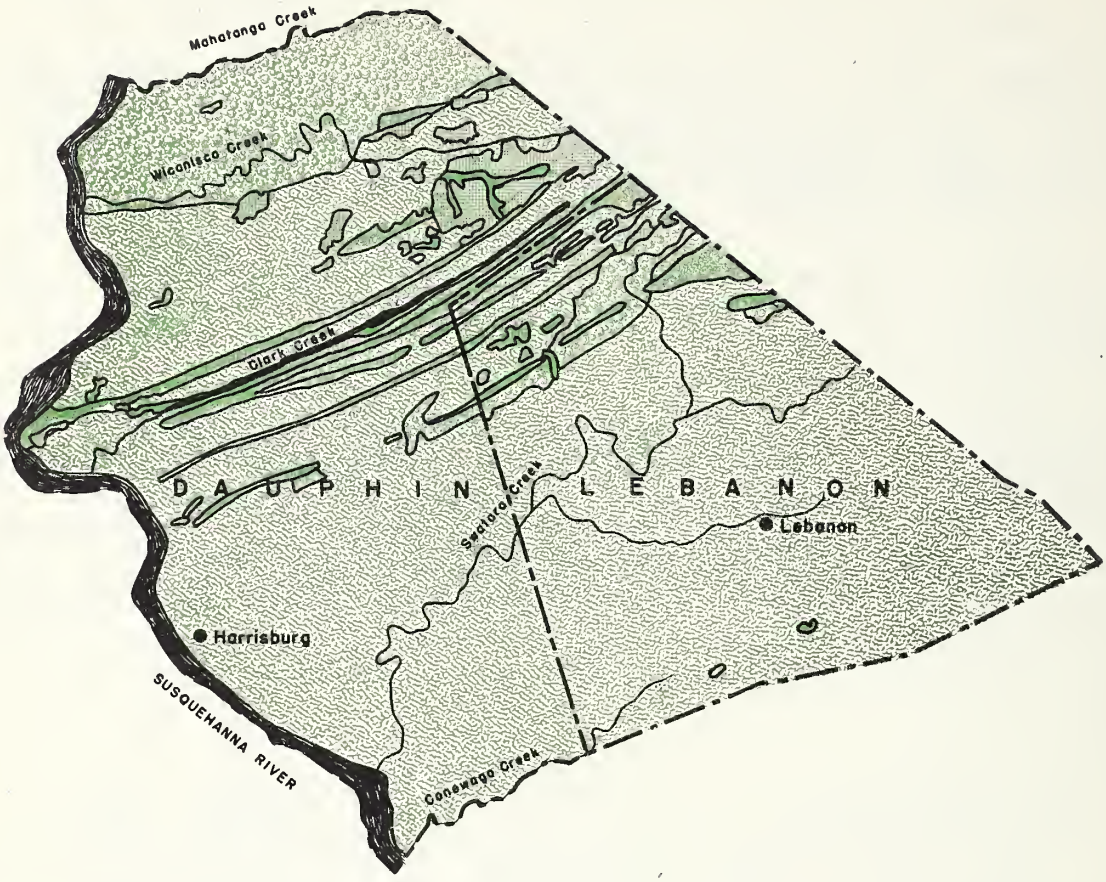
The production of anthracite, either by mining or by dredging from the Susquehanna, was employing about 900 persons in 1940. The total output was 522,888 tons, valued at $1,945,800. Large deposits of recoverable coal await future exploitation.

Agriculture is an important occupation throughout the southern parts of both counties. There are 4018 farms, of which 25 percent in Lebanon and 20 percent in Dauphin County are operated by tenants. In 1940, 223,905 acres, or nearly 40 percent of the total area of the two counties were under cultivation, and farm products valued at about $8,642,000 were produced. The chief products are milk, grain, and fruit.

OCCUPATIONS OF POPULATION: 1940[3/]

Total population		250,051	
Not in labor force		143,755	57%
In labor force		106,296	43%
Unemployed		13,749	13%
Employed		92,547	87%
Trade and service		44,272	48%
Manufacturing			
Metal	11,399)		
Textile	7,309)	29,653	32%
Food	5,294)		
Other	5,651)		
Agriculture		5,406	6%
Construction		4,200	5%
Transportation		5,924	6%
Forest products industries			
Forestry	16)		
Logging	21)		
Milling	238)	909	1%
Wood manufacture	156)		
Paper manufacture	478)		
Quarrying and other mining		1,127	1%
Coal mining		1,056	1%

3/ This table, based on the U. S. Census for 1940, indicates the primary occupations of the residents of Dauphin and Lebanon Counties. The



WHITE PINE - WHITE OAK - RED OAK
WHITE PINE - HEMLOCK
SCRUB OAK
CHESTNUT OAK
RED OAK - BLACK OAK - WHITE OAK
LAKES

Type symbols indicate areas where the given types predominate, but the frequent local occurance of other types is not precluded.

0 5 10 15 20
Scale in miles

FIGURE 2. - AREAS CHARACTERIZED BY THE MAJOR FOREST TYPES IN DAUPHIN & LEBANON COUNTIES

Forest Description

During the latter eighteenth and early nineteenth centuries lumbering was a large and important industry. Gradually the highly-fertile low lands were cleared and converted to agricultural use. In the later nineteenth and early twentieth centuries the forests on the mountains were logged over. At present only a few virgin stands remain, left because of their comparative inaccessibility. A certain amount of mine-prop production and some saw-timber production are still carried on, but lumbering has become of minor importance in Dauphin and Lebanon Counties. The chief use of the forests at present is for a hunting ground. Because of their proximity to the coal mines, the forests in the ridge country of Dauphin County have suffered greatly from fire.

Forest area

Only about 36 percent of the area of Dauphin and Lebanon Counties, or 210,400 acres, is in forest land (fig. 1)4/. The bulk of this is in a large and nearly unbroken tract along the ridges in the north. The remainder is in a hilly region in the southern part of Lebanon County and in scattered plots throughout the farming area. Over 90 percent is in tracts of 50 acres or larger5/.

	DAUPHIN		LEBANON	
	Acres	Percent	Acres	Percent
Forest land	137,100	39	73,300	32
Nonforest	213,700	61	158,600	68
Gross Area	350,800	100	231,900	100

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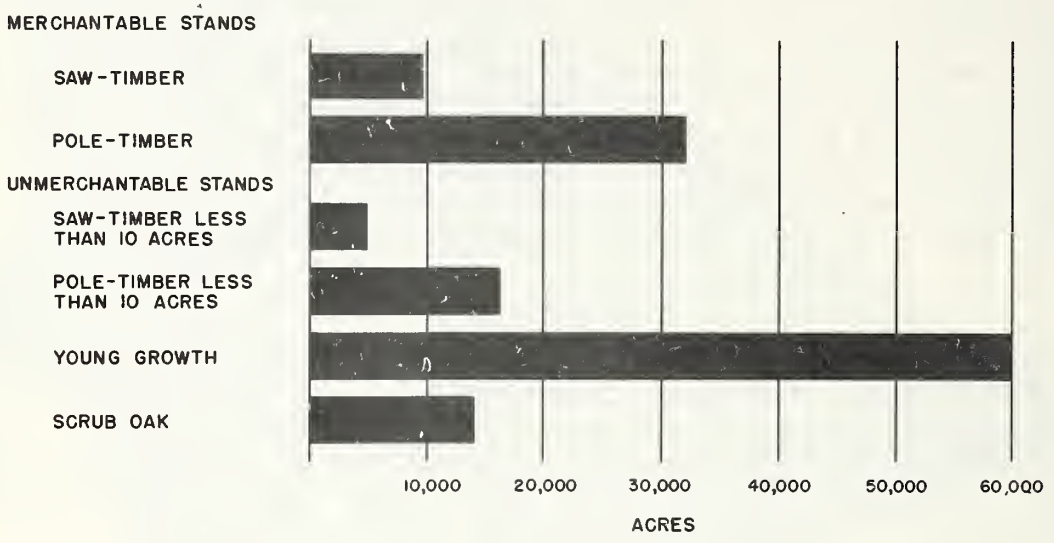
figures given in the text, on the other hand, are based on the employment provided by industries located within these counties. Discrepancies are due to the fact that many people live in one area and work in another. The figures given for forest products industries do not reflect all of the employment for these industries, because a considerable amount of the work is done on a part-time basis by men whose income is derived chiefly from other occupations.

4/ Maps showing the location of all forest tracts are available in a scale of 1" = 1 mile for each county; similar maps showing forest condition are also available. These maps may be ordered through the Northeastern Forest Experiment Station, 614 Bankers Securities Building, Philadelphia 7, Pa. A postal or express money order, draft or check made out to the Treasurer of the United States, covering the full amount, should accompany the order. Prints will be forwarded from the Forest Service, Division of Engineering in Washington, D. C. Each map will cost: Dauphin County $ .56, Lebanon County $ .44.

5/ For detail, see supplementary tables in the Appendix.

DAUPHIN COUNTY



LEBANON COUNTY

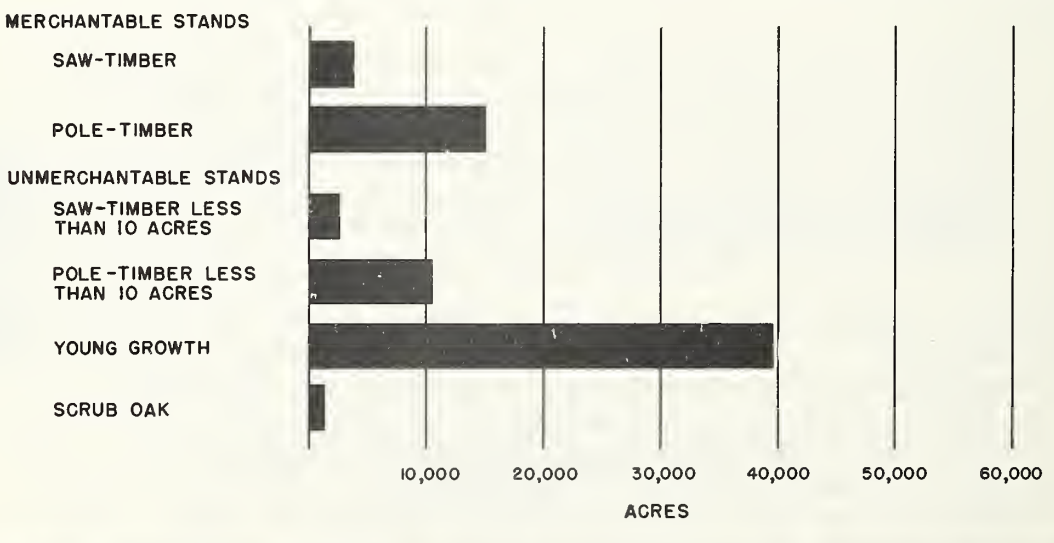


Figure 3.- THE CONDITION OF THE FOREST

Forest types

As the type map (fig. 2) shows, these forests are varied. In the north the area drained by the Wiconisco and Mahantango Creeks is predominantly in the white pine - white oak - red oak type. In the rest of the two counties the red oak - black oak - white oak type predominates. On the tops of the ridges this type gives way to chestnut oak. Along Stony Creek, between Second and Third Mountains, is a long strip of white pine and hemlock; and on Broad and Peters Mountains and in several other places in the ridge country are large tracts of scrub oak which are the result of fire.

Forest condition

Nearly 30 percent of the forest area in Dauphin and Lebanon Counties is merchantable (fig. 3)[6/]. Even the unmerchantable tracts are for the most part in promising condition. One large area of scrub oak in the neighborhood of Peters Mountain is the result of repeated fires. Elsewhere the unmerchantable areas are well stocked with young oaks that are rapidly approaching the pole-timber state. Because comparatively little mining is being done, the market for small material that has so devastated the forests further north and east is not such a menance here.

Timber volume

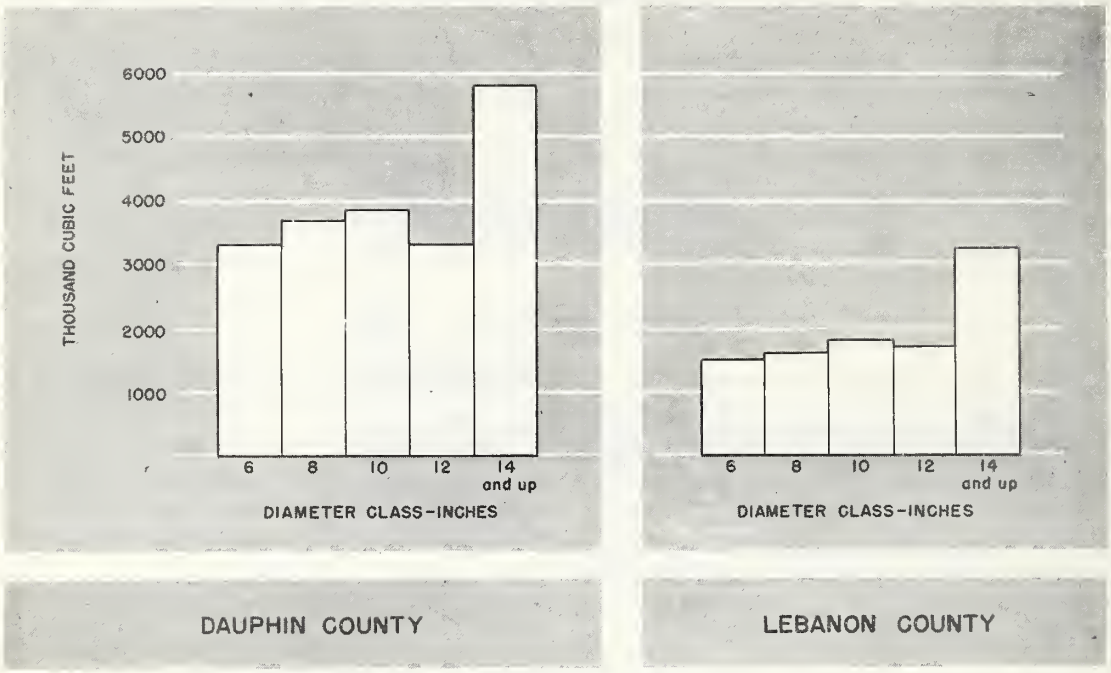
The volume of saw timber and the total green weight are shown in the following table[7/]:

	DAUPHIN		LEBANON	
	M bd.ft.	Tons	M bd.ft.	Tons
Saw-timber stands	47,100	496,500	14,400	165,600
Pole-timber stands	38,100	577,900	20,500	271,200
Unmerchantable stands	32,800	1,132,800	15,400	540,300
Total	118,000	2,207,200	50,300	977,100

6/ The condition classes recognized are: 1. Saw-timber stands: Stands of 10 acres or larger, each of which contains at least 2000 board feet of saw timber. 2. Pole-timber stands: Stands of 10 acres or larger, each acre of which contains a minimum timber volume of approximately 5 standard cords in trees 5.0 inches diameter breast high (hereafter denoted by the initials d.b.h.) and larger, and less than 2000 board feet of saw timber. 3. Unmerchantable stands: Areas of forest land which contain less than the minimum volume for pole-timber stands, plus stands of saw timber and pole timber of less than 10 acres in extent, whether isolated tracts or stands within larger forest areas.

7/ Saw-timber volume is the net board foot of sawlog-size material in conifers 9.0 inches d.b.h. and larger, plus the net volume of sawlog-

Figure 4.- CUBIC FOOT VOLUME IN MERCHANTABLE POLE-TIMBER STANDS BY DIAMETER CLASSES - ALL SPECIES.



DAUPHIN COUNTY

LEBANON COUNTY

The distribution of the cubic-foot volume in the merchantable pole-timber stands by tree size may be seen in figure 4. Approximately 70 percent of the green weight of all timber is in oaks and hickory:

	DAUPHIN		LEBANON	
	Tons	Percent	Tons	Percent
Conifers	72,100	13	40,200	15
Oaks, hickory	418,600	72	182,700	67
Other hardwoods	87,200	15	48,300	18
Total	577,900	100	271,200	100

Of the merchantable saw-timber stands over 70 percent are in Dauphin County. Some of these are virgin timber. Most of them, however, are

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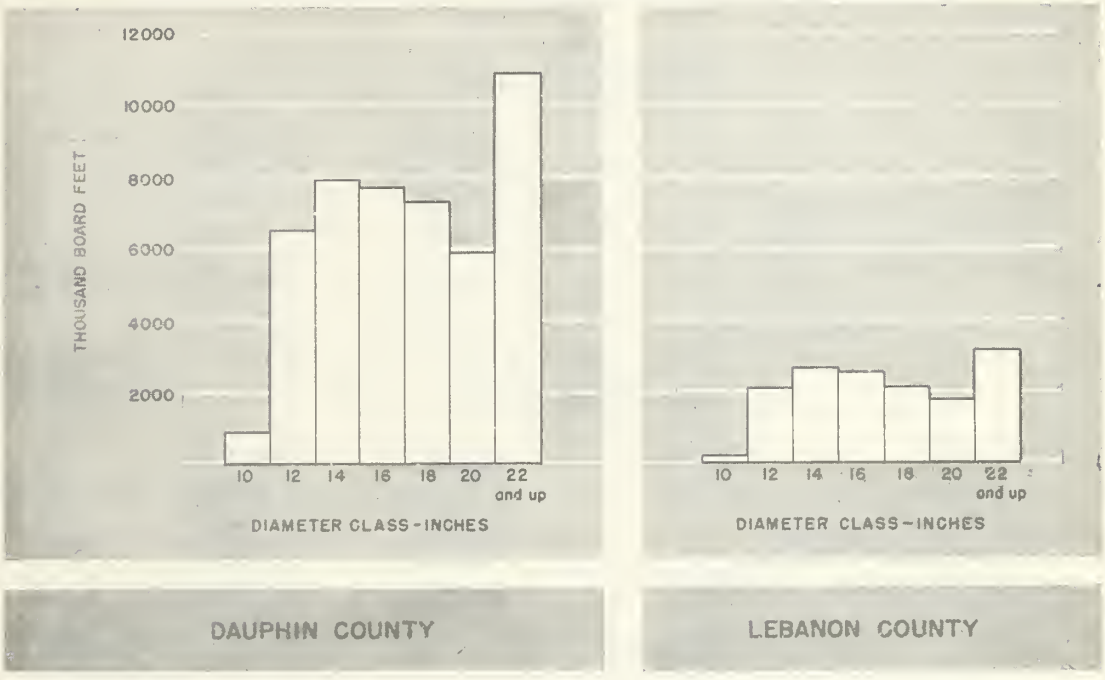
size material in hardwoods 11 inches d.b.h. and larger. Board foot volumes were based on the International 1/4" log rule, which closely approximates green lumber tally. Deductions were made for cull. Total green weight is the weight of all trees 5.0 inches and larger, including bark and the tops and limbs to a 4-inch diameter. This was computed in cubic feet and converted to tons (green weight) by the application of cubic foot-per-ton factors, varying by species groups and averaging about 35 cubic feet per ton.

Figure 5.- BOARD FOOT VOLUME IN MERCHANTABLE SAW-TIMBER STANDS BY DIAMETER CLASSES - ALL SPECIES.



DAUPHIN COUNTY

LEBANON COUNTY

young growth. Virtually all the virgin timber is in the inaccessible ravines of northern Dauphin.

	DAUPHIN		LEBANON	
Thousand Board Feet per Acre	Acres	M bd.ft.	Acres	M bd.ft.
8 and more	1,200	11,300	350	3,200
6 to 8	1,600	9,900	500	3,500
4 to 6	2,900	14,300	450	1,900
2 to 4	4,000	11,600	2,600	5,800
Total	9,700	47,100	3,900	14,400

The proportion of the volume in oaks and hickory is not quite so high in the saw-timber stands as in the pole-timber stands:

	DAUPHIN		LEBANON	
	M bd.ft.	Percent	M bd.ft.	Percent
Conifers	9,700	21	2,200	15
Oaks, hickory	28,200	60	9,300	65
Other hardwoods	9,200	19	2,900	20
Total	47,100	100	14,400	100

The distribution of this volume in saw-timber stands by tree size may be seen in figure 5.

Current forest growth

The following tables show the total timber growth and the saw-timber growth of the different condition classes in the two counties:

1943

Total timber growth

	DAUPHIN M cu.ft.	LEBANON M cu.ft.
Saw-timber stands	496	169
Pole-timber stands	1,125	538
Unmerchantable stands	3,381	1,654
Total timber growth	5,002	2,361

Saw-timber growth

	DAUPHIN M bd.ft.	LEBANON M bd.ft.
Saw-timber stands	1,870	590
Pole-timber stands	2,610	1,390
Unmerchantable stands	2,070	960
Total saw-timber growth	6,550	2,940

Forest Products Industries

The greater part of the employment provided by forest products industries in Dauphin and Lebanon Counties is in the remanufacture of lumber. In 1940 there were 10 planing mills with a total employment of 113, one of which was employing 25 persons. In addition 13 wood-using factories were in operation. The largest of these was a furniture factory employing 107 persons. Next largest were a wagon factory employing 42 and a wooden heel company employing 38. The others, none of which had as many as ten employees, were eight small furniture factories, a barrel factory, and a one-man concern making wooden models. Altogether the number employed in wood-using manufactures was 227. There were also 478 persons engaged in paper and cardboard manufacture.

In 1942 there were 14 sawmills in the two counties. The number of these mills by production classes is shown below:

Production class Thousand board feet	DAUPHIN Number of mills	LEBANON Number of mills
Idle	0	2
1 to 50	1	2
50 to 500	5	2
500 to 1000	1	1
Total	7	7

Forest Land Ownership

The largest single land-owner is the State Game Commission, which has the supervision of 21 percent of the forest land in the two counties, 3000 acres in the southwestern corner of Lebanon County and over 40,000 acres in the ridge country in the north. The state also owns a piece of land in the mountains south of Elizabethville, and a large tract, the Indiantown Gap reservation, in the southern ridges. Some few thousands of acres are owned by Dauphin County, and a few more thousands are community owned. Altogether 31 percent of the forest land of the two counties is in public ownership. Of the privately-owned forest land, 3 percent of the total belongs to coal companies, 7 percent to water companies, 17 percent to farmers, and 42 percent to other private owners.

The ownership distribution of the forest land in the two counties is given below:

	DAUPHIN Acres	LEBANON Acres
Public ownership		
State (Department of Forests and Waters)	8,800	4,400
State Game Commission	26,700	16,500
County	3,900	--
Community	4,300	--
Total public ownership	43,700	20,900
Private ownership		
Coal companies	5,900	--
Water companies	11,600	3,700
Farmers	26,800	9,300
Others	49,100	39,400
Total private ownership	93,400	52,400

Future Outlook in Brief

The relative unimportance of the forests of these two counties is at present standing them in good stead. Unlike the forests in other parts of the Anthracite Forest Region these woodlands are for the most part being left alone and are gradually growing back to merchantability. The needs of the anthracite industry in this area are comparatively modest; so there is little demand for small material. And the forest areas are sufficiently inaccessible to discourage the cutting of anything but extensive tracts of mature timber.

The only real menace to these forests is fire. Considerable damage has been done in the past by fire in the neighborhood of the mines and at high elevations. And since the forests are largely oak, and so are particularly susceptible to fire, they are in constant danger of destruction from that source. The principal need of the area therefore is an intensification of the fire prevention and control program of the State Department of Forests and Waters. More access roads and trails are essential in the ridge country. These would open large sections to recreationists, who must be educated in fire prevention. With effective fire prevention these forests need only time and care to become again good stands of merchantable timber.

Improvement cuttings and thinnings which remove low quality material will aid the development of productive forests. Much of the material removed can be used for mine timbers and other products. The Northeastern Forest Experiment Station is conducting research into management practices for the forest types of the Anthracite Forest Region. These studies should provide information on proper practices for these counties.

APPENDIX

Tables 1 to 9 - Dauphin County

Tables 1 to 9 - Lebanon County

DAUPHIN COUNTY

Table 1.--Land use

Land use	Area acres	Proportion of class percent	Proportion of gross area percent
Forest 1/			
Tracts less than 10 acres	3,900	2.8	1.1
Tracts 10 up to 50 acres	4,900	3.6	1.4
Tracts 50 acres and over	128,300	93.6	36.6
All forest land	137,100	100.0	39.1
Nonforest			
Cropland 2/	114,200	53.5	32.6
Mine waste 1/	500	0.2	0.1
Water 2/	18,100	8.5	5.2
Other	80,900	37.8	23.0
All nonforest land	213,700	100.0	60.9
Gross area	350,800	100.0	100.0

1/ Based on aerial photographs taken in 1937 - 1938.

2/ Bureau of the Census, 1940.

Table 2.--Forest area of each minor civil division

Civil division 1/	Gross area	Nonforest area	Forest area	Proportion gross area in forest	Proportion of county forest land
	acres	acres	acres	percent	percent
Conewago t.	10,400	9,000	1,400	13.3	0.7
Derry t., Hummelstown b.	18,200	16,000	2,200	12.3	1.7
East Hanover t.	24,700	13,100	11,600	46.9	8.5
Halifax t., Halifax b.	20,500	14,500	6,000	29.3	4.4
Harrisburg c.	6,300	6,200	100	1.4	*
Jackson t.	25,300	7,700	17,600	69.8	13.0
Jefferson t.	14,300	1,900	12,400	86.8	9.2
Londonderry t., Royalton b.	17,100	14,900	2,200	12.8	1.6
Lower Paxton t.	18,600	15,300	3,300	17.6	2.4
Lower Swatara t., Highspire b., Middletown b.	10,700	10,600	100	0.7	*
Lykens t., Gratz b.	17,900	11,600	6,300	35.4	4.7
Middle Paxton t., Dauphin b.	36,700	16,100	20,600	56.2	15.2
Mifflin t., Berrysburg b., and Uniontown b.	10,400	7,900	2,500	23.9	1.8
Reed t.	5,600	3,500	2,100	37.5	1.6
Rush t.	15,600	400	15,200	97.3	11.2
South Hanover t.	7,500	7,100	400	6.0	*
Susquehanna t., Penbrook b.	11,300	8,100	3,200	28.4	2.4
Swatara t., Paxtang b., Steelton b.	11,200	10,600	600	5.1	*
Upper Paxton t., Millersburg b.	19,200	13,900	5,300	27.4	3.9
Washington t., Elizabethville b.	11,800	8,300	3,500	29.5	2.6
Wayne t.	9,300	4,900	4,400	46.6	3.2
West Hanover t.	14,700	9,600	5,100	34.8	3.8
Wiconisco t., Lykens b.	7,900	1,300	6,600	83.5	4.8
Williams t., Williamstown b.	5,600	1,200	4,400	78.7	3.3
All civil divisions	350,800	213,700	137,100	39.1	100.0

1/ Abbreviations: t = township; b = borough; c = city.

* Negligible

Table 3.--Forest area by forest types and conditions

Forest type	Saw-timber stands		Pole-timber stands		Unmerchantable stands		All stands	
	acres	percent	acres	percent	acres	percent	acres	percent
White pine - hemlock	1,000	10.3	300	0.9	2,200	2.3	3,500	2.6
White pine - white oak - red oak	1,300	13.4	4,600	14.3	10,300	10.8	16,200	11.8
White oak - red oak - black oak	6,400	66.0	20,600	64.3	54,600	57.3	81,600	59.5
Chestnut oak	900	9.3	6,400	19.9	12,700	13.3	20,000	14.6
Scrub oak	--	--	--	--	14,100	14.8	14,100	10.3
Other	100	1.0	200	0.6	1,400	1.5	1,700	1.2
All types	9,700	100.0	32,100	100.0	95,300	100.0	137,100	100.0

Table 4.--Volume by forest types

Forest type	Saw-timber volume M bd.ft.	Total volume M cu.ft.
Sugar maple - beech - yellow birch	--	--
Aspen - gray birch - pin cherry	--	--
White pine - hemlock	7,500	3,620
White pine - white oak - red oak	17,500	11,780
Red oak - black oak - white oak	76,300	50,410
Chestnut oak	14,700	9,690
Scrub oak	300	490
Other	1,700	950
All forest types	118,000	76,940

Table 5.--Forest area by forest conditions and volume-per-acre classes

Forest condition and volume-per-acre classes	Area	Proportion of each condition	Proportion of total forest land
	acres	percent	percent
Merchantable:			
Saw-timber stands 1/ (bd. ft. per acre)			
8,000 and over	1,200	12.4	0.9
6,000 to 7,999	1,600	16.5	1.2
4,000 to 5,999	2,900	29.9	2.1
2,000 to 3,999	4,000	41.2	2.9
All saw-timber stands	9,700	100.0	7.1
Pole-timber stands 2/ (cords per acre)			
10.0 and over	9,500	29.6	6.9
5.0 to 9.9	22,600	70.4	16.5
All pole-timber stands	32,100	100.0	23.4
All merchantable stands	41,800		30.5
Unmerchantable:			
Saw-timber stands less than 10 acres	4,900		3.6
Pole-timber stands less than 10 acres	16,200		11.8
Young growth stands	60,100		43.8
Scrub oak stands	14,100		10.3
All unmerchantable stands	95,300		69.5
All forest land	137,100		100.0

1/ In stands 10 acres or larger each acre of which has at least 2,000 board feet (lumber tally).

2/ In stands 10 acres or larger each acre of which has at least 5 cords (400 cubic feet) but less than 2,000 board feet.

Table 6.--Volume by forest conditions and volume-per-acre classes

Forest condition and volume-per-acre classes	Saw-timber volume (lumber tally) 1/		Total volume (including bark)			
	M bd.ft.	percent	M cu.ft.	percent	cords	tons
Merchantable:						
Saw-timber stands (bd. ft. per acre)						
8,000 and over	11,300	9.6	2,990	3.9	39,300	86,400
6,000 to 7,999	9,900	8.4	3,300	4.3	43,300	95,300
4,000 to 5,999	14,300	12.1	5,340	6.9	70,000	153,900
2,000 to 3,999	11,600	9.8	5,600	7.3	73,100	160,900
All saw-timber stands	47,100	39.9	17,230	22.4	225,700	496,500
Pole-timber stands (cords per acre)						
10.0 and over	18,100	15.3	8,300	10.8	108,400	236,900
5.0 to 9.9	20,000	17.0	11,940	15.5	156,100	341,000
All pole-timber stands	38,100	32.3	20,240	26.3	264,500	577,900
All merchantable stands	85,200	72.2	37,470	48.7	490,200	1,074,400
All unmerchantable stands	32,800	27.8	39,470	51.3	526,200	1,132,800
All forest land	118,000	100.0	76,940	100.0	1,016,400	2,207,200

1/ Based on the International 1/4-inch rule which closely approximates green lumber tally.

Table 7.--Volume in merchantable stands by species groups

Merchantable class and species group	Saw-timber volume (lumber tally)		Total volume (including bark)					
	M bd.ft.	percent	M cu.ft.	percent	cords 1/	percent	tons 2/	percent
Saw-timber stands								
Conifers	9,700	20.6	2,490	14.5	29,300	13.0	52,900	10.7
Oaks and hickory	28,200	59.9	11,950	69.3	159,200	70.6	370,000	74.5
Other hardwoods	9,200	19.5	2,790	16.2	37,200	16.4	73,600	14.8
All species	47,100	100.0	17,230	100.0	225,700	100.0	496,500	100.0
Pole-timber stands								
Conifers	9,500	25.0	3,460	17.1	40,700	15.4	72,100	12.5
Oaks and hickory	22,700	59.4	13,520	66.8	180,300	68.2	418,600	72.4
Other hardwoods	5,900	15.6	3,260	16.1	43,500	16.4	87,200	15.1
All species	38,100	100.0	20,240	100.0	264,500	100.0	577,900	100.0
All merchantable stands	85,200		37,470		490,200		1,074,400	

1/ Based on 85 cubic feet per cord for conifers and 75 cubic feet per cord for hardwoods.

2/ Based on cubic feet-per-ton converting factors for the principal species.

Table 8.--Board foot volume in merchantable saw-timber stands by diameter classes and species groups

Diameter class (d.b.h.)	Conifers 1/		Oaks, hickory 2/		Other hardwoods 3/		All species	
(Inches)	M bd.ft.	percent	M bd.ft.	percent	M bd.ft.	percent	M bd.ft.	percent
10	900	9.4					900	1.9
12	1,500	15.6	3,100	11.0	1,900	21.0	6,500	13.8
14	1,800	18.2	4,300	15.2	1,800	19.3	7,900	16.8
16	1,400	14.1	4,700	16.8	1,600	17.8	7,700	16.3
18	1,700	17.2	4,500	16.0	1,100	12.4	7,300	15.5
20	1,000	10.5	3,900	13.9	1,000	10.3	5,900	12.5
22 & up	1,400	15.0	7,700	27.1	1,800	19.2	10,900	23.2
All classes	9,700	100.0	28,200	100.0	9,200	100.0	47,100	100.0

1/ Principally white pine, hemlock and pitch pine.

2/ Principally white, red, and black oaks, with some hickory and chestnut, scarlet and pin oaks.

3/ Principally red maple, black birch, yellow poplar and white ash with some walnut, aspen, black locust, sycamore, willow, basswood, elm and black gum.

Table 9.--Cubic foot volume in merchantable pole-timber stands by diameter classes and species groups

Diameter class (d.b.h.)	Conifers 1/			Oaks and hickory 2/			Other hardwoods 3/			All species		
inches	M cu.ft.	percent	tons	M cu.ft.	percent	tons	M cu.ft.	percent	tons	M cu.ft.	percent	tons
6	380	11.0	7,900	2,340	17.3	72,400	830	25.4	22,100	3,550	17.5	102,400
8	530	15.3	11,000	2,410	17.8	74,500	780	23.9	20,800	3,720	18.4	106,300
10	670	19.4	14,000	2,540	18.8	78,700	670	20.6	18,000	3,880	19.2	110,700
12	780	22.5	16,200	2,120	15.7	65,700	410	12.6	11,000	3,310	16.4	92,900
14 & up	1,100	31.8	23,000	4,110	30.4	127,300	570	17.5	15,300	5,780	28.5	165,600
All classes	3,460	100.0	72,100	13,520	100.0	418,600	3,260	100.0	87,200	20,240	100.0	577,900

1/ Principally white pine, hemlock, and pitch pine.

2/ Principally white, red, chestnut, and black oak, with some hickory, scarlet oak, and pin oak.

3/ Principally red maple, black birch, and white ash, with some yellow poplar, walnut, aspen, sycamore, willow, black locust, elm, yellow birch, red birch, basswood, black gum, and dogwood.

Table 1.--Land use

Land use	Area	Proportion of class	Proportion of gross area
	acres	percent	percent
Forest 1/			
Tracts less than 10 acres	2,500	3.5	1.1
Tracts 10 up to 50 acres	3,200	4.4	1.4
Tracts 50 acres and over	67,600	92.1	29.1
All forest land	73,300	100.0	31.6
Nonforest			
Cropland 2/	109,700	69.2	47.3
Mine waste 1/	500	0.3	0.2
Water 2/	100	0.1	0.1
Other	48,300	30.4	20.8
All nonforest land	158,600	100.0	68.4
Gross area	231,900	100.0	100.0

1/ Based on aerial photographs taken in 1937, 1938 - 1940.

2/ Bureau of the Census, 1940

Table 2.--Forest area by minor civil divisions

Civil division 1/	Gross area	Nonforest area	Forest area	Proportion gross area in forest	Proportion of county forest land
	acres	acres	acres	percent	percent
Annville t.	1,100	1,100	*	0.3	*
Bethel t.	22,400	14,200	8,200	36.6	11.3
Cold Spring t.	13,100	*	13,100	99.9	18.0
Cornwall b.	6,200	2,700	3,500	56.7	4.8
East Hanover t.	21,700	14,800	6,900	31.9	9.5
Heidelberg t.	15,600	12,200	3,400	22.0	4.1
Jackson t., Myerstown b.	15,800	13,200	2,600	16.7	3.6
Millcreek t., and Richland b.	13,600	9,000	4,600	33.8	6.3
North Annville t.	11,600	9,900	1,700	14.4	2.3
North Cornwall t., Cleona b., Lebanon Independent b., and Lebanon c.	9,500	9,400	100	0.9	*
North Lebanon t.	10,400	10,000	400	3.4	0.5
North Londonderry t., Palmyra b.	8,000	7,500	500	5.7	0.7
South Annville t.	12,400	10,100	2,300	18.3	3.1
South Lebanon t.	13,600	11,000	2,600	19.3	3.6
South Londonderry t., Mount Gretna b.	16,100	9,500	6,600	41.0	9.0
Swatara t., Jonestown b.	13,500	10,000	3,500	26.1	4.9
Union t.	21,500	11,400	10,100	47.1	13.9
West Cornwall t.	5,500	2,300	3,200	57.7	4.4
West Lebanon t.	300	300	*	3.1	*
All civil divisions	231,900	158,600	73,300	31.6	100.0

1/ Abbreviations: t = township; b = borough; c = city.

* Negligible

Table 3.--Forest area by forest types and conditions

Forest type	Saw-timber stands		Pole-timber stands		Unmerchantable stands		All stands	
	acres	percent	acres	percent	acres	percent	acres	percent
White pine - hemlock	100	2.6	200	1.3	500	0.9	800	1.1
White pine - white oak - red oak	700	17.9	1,000	6.6	7,800	14.4	9,500	13.0
White oak - red oak - black oak	3,000	76.9	10,300	68.3	36,500	67.2	49,800	67.9
Chestnut oak	100	2.6	3,600	23.8	8,300	15.3	12,000	16.4
Scrub oak	--	--	--	--	1,200	2.2	1,200	1.6
All types	3,900	100.0	15,100	100.0	54,300	100.0	73,300	100.0

Table 4.--Volume by forest types

Forest type	Saw-timber volume M bd.ft.	Total volume M cu.ft.
Sugar maple - beech - yellow birch	--	--
Aspen - gray birch - pin cherry	--	--
White pine - hemlock	1,000	550
White pine - white oak - red oak	7,500	5,420
Red oak - black oak - white oak	35,900	24,340
Chestnut oak	5,900	4,320
Scrub oak	--	40
Other	--	--
All forest types	50,300	34,670

Table 5.--Forest area by forest conditions and volume-per-acre classes

Forest condition and volume-per-acre classes	Area	Proportion of each condition	Proportion of total forest land
	acres	percent	percent
Merchantable:			
Saw-timber stands 1/ (bd. ft. per acre)			
8,000 and over	350	9.0	0.5
6,000 to 7,999	500	12.8	9.7
4,000 to 5,999	450	11.5	0.6
2,000 to 3,999	2,600	66.7	3.5
All saw-timber stands	3,900	100.0	5.3
Pole-timber stands 2/ (cords per acre)			
10.0 and over	5,400	35.8	7.4
5.0 to 9.9	9,700	64.2	13.2
All pole-timber stands	15,100	100.0	20.6
All merchantable stands	19,000		25.9
Unmerchantable:			
Saw-timber stands less than 10 acres	2,700		3.7
Pole-timber stands less than 10 acres	10,600		14.5
Young growth stands	39,800		54.3
Scrub oak stands	1,200		1.6
All unmerchantable stands	54,300		74.1
All forest land	73,300		100.0

1/ In stands 10 acres or larger each acre of which has at least 2,000 board feet (lumber tally).

2/ In stands 10 acres or larger each acre of which has at least 5 cords (400 cubic feet) but less than 2,000 board feet.

Table 6.--Volume by forest conditions and volume-per-acre classes

Forest condition and volume-per-acre classes	Saw-timber volume (lumber tally) 1/		Total volume (including bark)			
	M bd.ft.	percent	M cu.ft.	percent	cords	tons
Merchantable:						
Saw-timber stands (bd. ft. per acre)						
8,000 and over	3,200	6.4	820	2.4	10,800	23,900
6,000 to 7,999	3,500	7.0	1,140	3.3	15,100	33,100
4,000 to 5,999	1,900	3.7	710	2.0	9,300	20,500
2,000 to 3,999	5,800	11.5	3,040	8.8	40,000	88,100
All saw-timber stands	14,400	28.6	5,710	16.5	75,200	165,600
Pole-timber stands (cords per acre)						
10.0 and over	12,700	25.3	5,140	14.8	66,800	142,100
5.0 to 9.9	7,800	15.5	4,660	13.4	60,700	129,100
All pole-timber stands	20,500	40.8	9,800	28.2	127,500	271,200
All merchantable stands	34,900	69.4	15,510	44.7	202,700	436,800
All unmerchantable stands	15,400	30.6	19,160	55.3	255,400	540,300
All forest land	50,300	100.0	34,670	100.0	458,100	977,100

1/ Based on the International 1/4-inch rule which closely approximates green lumber tally.

Table 7.--Volume in merchantable stands by species groups

Merchantable class and species group	Saw-timber volume (lumber tally)		Total volume (including bark)					
	M bd.ft.	percent	M cu.ft.	percent	cords 1/	percent	tons 2/	percent
Saw-timber stands								
Conifers	2,200	15.3	580	10.2	6,800	9.1	11,600	7.0
Oaks and hickory	9,300	64.6	4,250	74.4	56,700	75.3	131,600	79.5
Other hardwoods	2,900	20.1	880	15.4	11,700	15.6	22,400	13.5
All species	14,400	100.0	5,710	100.0	75,200	100.0	165,600	100.0
Pole-timber stands								
Conifers	6,600	32.1	2,050	20.9	24,100	18.9	40,200	14.8
Oaks and hickory	10,200	50.0	5,900	60.2	78,700	61.7	182,700	67.4
Other hardwoods	3,700	17.9	1,850	18.9	24,700	19.4	48,300	17.8
All species	20,500	100.00	9,800	100.0	127,500	100.0	271,200	100.0
All merchantable stands	34,900		15,510		202,700		436,800	

1/ Based on 85 cubic feet per cord for conifers and 75 cubic feet per cord for hardwoods.

2/ Based on cubic feet-per-ton converting factors for the principal species.

Table 8.--Board foot volume in merchantable saw-timber stands by diameter classes and species groups

Diameter class (d.b.h.)	Conifers 1/		Oaks, hickory, hard maple 2/		Other hardwoods 3/		All species	
(Inches)	M bd.ft.	percent	M bd.ft.	percent	M bd.ft.	percent	M bd.ft.	percent
10	200	10.0					200	1.4
12	300	14.1	1,200	12.5	600	22.4	2,100	14.6
14	400	17.4	1,600	17.2	600	20.3	2,600	18.0
16	300	13.6	1,700	18.2	500	18.3	2,500	17.4
18	400	19.5	1,400	15.1	300	11.0	2,100	14.6
20	300	10.9	1,200	12.9	300	9.0	1,800	12.5
22 & up	300	14.5	2,200	24.1	600	19.0	3,100	21.5
All classes	2,200	100.0	9,300	100.0	2,900	100.0	14,400	100.0

1/ Principally white pine, hemlock, and pitch pine.

2/ Principally white, red, and black oaks, with some hickory and chestnut, scarlet, and pin oaks.

3/ Principally red maple, black birch, yellow poplar, and white ash, with some walnut, aspen, black locust, sycamore, willow, basswood, elm, and black gum.

Table 9.--Cubic foot volume in merchantable pole-timber stands by diameter classes and species groups

Diameter class (d.b.h.)	Conifers 1/			Oaks and hickory 2/			Other hardwoods 3/			All species		
inches	M cu.ft.	percent	tons	M cu.ft.	percent	tons	M cu.ft.	percent	tons	M cu.ft.	percent	tons
6	200	9.8	3,900	830	14.1	25,800	460	24.8	12,000	1,490	15.2	41,700
8	310	15.1	6,100	930	15.8	28,900	390	21.1	10,200	1,630	16.6	45,200
10	390	19.0	7,600	1,050	17.8	32,500	370	20.0	9,600	1,810	18.5	49,700
12	450	22.0	8,900	1,000	16.9	30,900	240	13.0	6,300	1,690	17.2	46,100
14 & up	700	34.1	13,700	2,090	35.4	64,600	390	21.1	10,200	3,180	32.5	88,500
All classes	2,050	100.0	40,200	5,900	100.0	182,700	1,850	100.0	48,300	9,800	100.0	271,200

1/ Principally white pine, hemlock, and pitch pine.

2/ Principally white, red, chestnut, and black oak, with some scarlet oak, pin oak, and hickory.

3/ Principally red maple, black birch, and white ash, with some yellow poplar, walnut, aspen, sycamore, willow, black locust, yellow birch, red birch, basswood, black gum, and dogwood.

Anthracite Survey Papers

No.	Title
1	Survey of Forest Employment Possibilities in the Anthracite Region of Pennsylvania*
2	Intensified Protection of Wyoming Valley Forests Against Fire Through Use of Community [illegible]
3	Tax Delinquency of Forest Lands in the Anthracite Region of Pennsylvania**
4	Volume Tables for Commercial Timber in the Anthracite Region of Pennsylvania*
5	The Forests of Luzerne County, Pennsylvania, in Relation to Employment and Welfare
6	The Population and Employment Outlook for the Anthracite Region of Pennsylvania
7	The Forest Situation in Pike and Monroe Counties
8	The Forest Situation in Dauphin and Lebanon Counties
9	The Forest Situation in Schuylkill and Carbon Counties***
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